

REMARKS

Claims 26-63 are pending in the application. Claims 26, 43, 48, and 61 have been amended herein for consistency and to better describe certain aspects of the invention. Favorable reconsideration in light of the amendments and the remarks which follow is respectfully requested.

The Amendments and Allowable Subject Matter

The Examiner's indication that claim 63 contains allowable subject matter is noted with appreciation. The independent claims have been amended to specify that chlorine dioxide is generated WITHIN the claimed device, and then the chlorine dioxide is passed out of the claimed device to the surrounding water to form an aqueous solution of chlorine dioxide.

The Rejection of Claims 43 and 48 Under 35 U.S.C. §112, First Paragraph

Claims 43 and 48 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Claims 43 and 48 have been amended to recite "wherein the metal chlorite is in the form of powders and the metal chlorite is mixed with the acid forming component in the enclosed space." Support is found, for example, on page 19, lines 7-12 of the specification.

The Obviousness Rejection over EP'550 in view of either CN'610 or CA'238

Claims 26-60 have been rejected under 35 U.S.C. § 103(a) over EP 0 581 550 (EP'550) in view of either CN 1,104,610 (CN'610) or CA 959,238 (CA'238). EP'550 relates to a solid composition of a chlorite salt, a chlorine releasing agent, and a proton donor admixed together under anhydrous conditions. The admixture is then dissolved in water to quickly and immediately produce chlorine dioxide.

CN'610 relates to a non-woven cloth bag containing 1) microcapsules of wax, stearic acid and sodium chlorate and 2) solid acidifier tartaric or oxalic acid microcapsules. The bag then produces chlorine dioxide when placed in water.

Microcapsulating the sodium chlorate in wax enables the direct mixing with the solid acidifier microcapsules without easily reacting.

CA'238 relates to producing chlorine dioxide by immersing a water soluble envelope or container of an alkali or alkaline earth metal chlorite and acid in water in a receptacle. The alkali/alkaline earth metal chlorite and acid are SEPARATELY wrapped in the water soluble envelope or container. See page 4, line 5 of CA'238. That is, the alkali/alkaline earth metal chlorite and acid are in contact with each other after the dissolution of the envelope or container in the receptacle.

While the Examiner concedes that EP'550 does not teach or suggest a membrane that separates a solid composition and a water solution, the Examiner contends that it would have been obvious to arrive at the claimed invention by combining a water soluble material of CA'238 or a non-woven cloth bag of CN'610 with the chlorine generating composition of EP'550. Applicants respectfully disagree.

The cited references, independently or in combination, do not disclose, teach, or suggest a membrane as required in the claims. The membrane comprises a material which permits: (a) controlled passage of liquid water and/or water vapor into the enclosed space to thereby allow the metal chlorite and the acid forming component to react to produce chlorine dioxide within the enclosed space and (b) passage of the so produced chlorine dioxide into a body of liquid water to produce the aqueous solution of chlorine dioxide. By using the membrane, the claimed device can controllably produce an aqueous solution of chlorine dioxide when said device is placed into water.

CA'238 requires that two envelopes or containers in a receptacle that each separately contain a chlorite and an acid to be dissolved immediately when water is introduced into the receptacle. CA'238 teaches at page 4, first paragraph that "the chlorite and the acid are each separately wrapped or packed in a water soluble envelope or container so that upon the introduction of water into the receptacle, the water soluble envelopes dissolve, then permitting the reactants, to wit the chlorite and the acid, to react and to form chlorine dioxide." Thus, CA teaches only that the envelope or container need to be dissolved. There is no teaching or suggestion to

employ a membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space.

Moreover, in CA'238, chlorine dioxide is not produced within the enclosed space, as required in the claims. The water soluble envelope or container of CA'238 is dissolved in water in the receptacle, and then the chlorite contacts with the acid in the receptacle. When the chlorite contacts with the acid to produce chlorine dioxide in the receptacle, there is no enclosed space since the envelope or container has been dissolved.

CA'238 teaches that weak acids are preferable "since the reaction between the chlorite and [strong] acid[s] may be too violent and thus difficult to control" (page 5, liens 4-7 of CA'238). CA'238 explains tartaric acid and citric acid as the weak acid (page 5, lien 13 of CA'238). CA'238 also teaches that "if slow reaction is desirable the particle size [of sodium chlorite] should therefore be increased" (page 12, lines 7-8 of CA'238). One skilled in the art would understand from the teachings of CA'238 that weak acids and/or large particle of sodium chlorite should be used to avoid a sudden generation of chlorine dioxide. However, one skilled in the art would have no motivation to employ a membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space since there is no teaching or suggestion of such membranes in CA'238.

CN'610 discloses that "sodium chlorate microcapsules . . . and dried solid acidifier tartaric or oxalic acid microcapsules . . . [are] packaged in a non-woven cloth bag" (page 3, lines 21-23 of the translation of CN'610). The sodium chlorate microcapsules contain sodium chlorate, and beeswax, stearic acid, or paraffin (page 3, lines 18-19 of the translation of CN'610). The microcapsules are produced by using a number 20 mesh screen (page 3, line 2 of the translation of CN'610). Mesh refers to the openings between threads of a screen and is measured by the number of openings per inch, that is, 20 mesh equals 20 holes or openings per inch or 25.4 mm. Thus, one skilled in the art would understand that "microcapsules" in CN'610 has a size of about 1 mm. One skilled in the art would understand from the teachings of CN'610 that to avoid

the sudden generation of chlorine dioxide, 1) sodium chlorate should be protected with a wax coating, 2) sodium chlorate should be in the form of 1mm "microcapsules," 3) weak acids such as tartaric acid or oxalic acid should be used, and 4) the tartaric acid and oxalic acid also should be in the form of the "microcapsules." However, there is no teaching or suggestion to employ a membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space to avoid a sudden generation of chlorine dioxide. One skilled in the art would have no motivation to employ a membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space to hold such 1mm "microcapsules" of CN'610.

Contrary to the teachings of CN'610, the claimed invention does not need the wax coating and microcapsules to decrease the reaction rate since the claimed invention employs totally different control features - the membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space. Contrary to the teachings of CN'610, the claimed invention contains a direct mixture of metal chlorite and specific acid forming components due to the membrane. The sodium chlorate and tartaric or oxalic acid of CN'610 must be in the form of 1mm "microcapsules" because the bag permits uncontrolled passage of water into the bag.

Applicants respectfully request the Examiner to identify where is a factual support in CN'610 and CA'238 that shows the direct mixture of metal chlorite and specific acid forming components, and the membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space. In this connection, MPEP 2142 states as follows:

The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness[;] . . . the applicant is under no obligation to submit evidence of nonobviousness.

...
To reach a proper determination under 35 U.S.C. 103, the examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. In view of all factual information, the examiner must

then make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. **Knowledge of applicant's disclosure must be put aside** in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention. The tendency to resort to "hindsight" based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

(MPEP 2142, emphasis added).

One skilled in the art could not have arrive at the specific configuration of the claimed invention based on the teaching of CA'238 or CN'610 since there is no teaching or suggestion of a membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space to control producing chlorine dioxide. One could optimize every features within the disclosure of CA'238 and CN'610 and still not attain the specific configuration defined in the claims. On the other hand, if the Examiner is contending that it would be obvious to employ the membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space without using the wax-coated "microcapsules," it would be a case of improper reliance on Applicants' own specification to justify the rejection.

For at least these reasons, EP'550 and CN'610 or CA'238 cannot render claims 26-60 obvious. Withdrawal of the rejection of claims 26-60 is therefore respectfully requested.

The Obviousness Rejection over Aston in view of either CN'610 or CA'238

Claims 26-36 and 39-61 have been rejected under 35 U.S.C. § 103(a) over Aston (US Patent No. 2,482,891) in view of either CN'610 or CA'238. The Applicants respectfully request withdrawal of the rejection for at least the following reasons. The asserted combination does not teach or suggest all the features of the claimed invention.

While the Examiner concedes that Aston does not teach or suggest a membrane that separates a solid composition and a water solution, the Examiner contends that it would have been obvious to arrive at the claimed invention by combining a water soluble material of CA'238 or a non-woven cloth bag of CN'610 with a composition of Aston. Applicants respectfully disagree.

The cited references, independently or in combination, do not disclose, teach, or suggest a membrane as required in the claims. The membrane comprises a material which permits: (a) controlled passage of liquid water and/or water vapor into the enclosed space to thereby allow the metal chlorite and the acid forming component to react to produce chlorine dioxide within the enclosed space and (b) passage of the so produced chlorine dioxide into a body of liquid water to produce the aqueous solution of chlorine dioxide. By using the membrane, the claimed device can controllably produce an aqueous solution of chlorine dioxide when said device is placed into water.

As mentioned in the previous section, 1) CA'238 does not teach or suggest any membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space, 2) CA'238 teaches that two envelopes or containers in a receptacle that each separately contain a chlorite and an acid to be dissolved immediately when water is introduced into the receptacle, and 3) chlorine dioxide is not produced within the enclosed space, as required in the claims. Also, 1) CN'610 does not teach or suggest any membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space, 2) CN'610 does not teach or suggest a direct mixture of metal chlorite and acid forming component, and 3) CN'610 requires using 1mm sodium chlorate microcapsules and tartaric or oxalic acid microcapsules.

One skilled in the art could not have arrive at the specific configuration of the claimed invention based on the teaching of CA'238 or CN'610 since there is no teaching or suggestion of a membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space to control producing chlorine dioxide. One could optimize every features within the disclosure of CA'238 and CN'610 and still not attain the specific configuration defined in the claims. On the other hand, if the

Examiner is contending that it would be obvious to employ the membrane that permits controlled passage of liquid water and/or water vapor into the enclosed space without using the wax-coated "microcapsules," it would be a case of improper reliance on Applicants' own specification to justify the rejection.

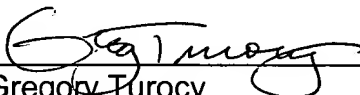
For at least these reasons, Aston and CN'610 or CA'238 cannot render claims 26-60 obvious. Withdrawal of the rejection of claims 26-60 is therefore respectfully requested.

Should the Examiner believe that a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

In the event any fees are due in connection with the filing of this document, the Commissioner is authorized to charge those fees to our Deposit Account No. 50-1063.

Respectfully submitted,

AMIN & TUROCY, LLP



Gregory Turocy
Reg. No. 36,952

24th Floor, National City Center
1900 East 9th Street
Cleveland, Ohio 44114
(216) 696-8730
Fax (216) 696-8731